

CLAIMS

What is claimed is:

1. An electronic circuit module comprising:

at least one IC package unit, each unit having

a carrier having first and second IC package mounting locations on
opposed sides thereof, said first mounting location having a first mounting pad array,
said second mounting location having a second mounting pad array, said first and
second mounting arrays being coupled to a carrier interface; and

a pair of IC packages, each package having a package body containing
an integrated circuit chip and a plurality of connection elements coupled to said chip
and extending at least to the surface of said body, the connection elements of said first
package being conductively bonded to said first mounting pad array, the connection
elements of said second package being conductively bonded to said second mounting
pad array; and

a printed circuit board having at least one interconnection pad array affixed
thereto, each interconnection pad array coupled to circuitry on the printed circuit board
and conductively bonded to the interface of a single IC package unit.

2. The electronic circuit module of claim 1, wherein individual mounting pads of said
first mounting pad array are coupled to individual mounting pads of said second
mounting pad array by means of conductive links within the carrier, and the leads of
one of said IC packages are conductively bonded directly to said interconnection pad

array.

3. The electronic circuit module of claim 1, wherein said carrier comprises a flexible polymeric film having first and second major planar faces corresponding, respectively, to said first and second IC package mounting locations.

4. The electronic circuit module of claim 3, wherein said circuit board includes a recess for each package unit affixed thereto, said recess receiving at least a portion of the body of one of said packages.

5. The electronic circuit module of claim 1, wherein said carrier comprises a semi-rigid laminar substrate having first and second major faces corresponding, respectively, to said first and second IC package mounting locations.

6. The electronic circuit module of claim 5, wherein said circuit board includes a recess for each package unit affixed thereto, said recess receiving at least a portion of the body of one of said packages.

7. The electronic circuit module of claim 5, wherein said carrier further comprises a plurality of carrier leads, and individual mounting pads of said first mounting pad array and of said second mounting pad array are conductively coupled to individual carrier leads, said carrier leads being conductively bonded directly to said interconnection pad array.

8. The electronic circuit module of claim 7, wherein said carrier leads are L-shaped and butt-soldered to the pads of the interconnection pad array.

9. The electronic circuit module of claim 7, wherein said carrier leads are gullwing shaped.

10. The electronic circuit module of claim 5, wherein each of said first and second major faces incorporates a recess for receiving a single IC package.

11. The electronic circuit module of claim 5, wherein said first major face is planar, and said second major face incorporates a recess, said first IC package is mounted on said planar first major face and said second IC package is mounted within said recess.

12. The electronic module of claim 1, wherein each IC package is of the ball-grid array type.

13. An electronic circuit module comprising:
at least one pair of IC packages, each package having a package body, an integrated circuit chip embedded within said body, and a plurality of connection elements coupled to said chip which extend at least to the surface of said body;
one package carrier for each IC package pair, each carrier having two opposing major faces, each face having a mounting pad array to which the connection elements of one IC package of each package pair are conductively bonded, each

8 carrier having an interface coupled to the connection elements of both IC packages;

9 and

10 a printed circuit board having at least one interconnection pad array affixed
11 thereto, each interconnection pad array conductively bonded to the carrier interface.

1 14. The electronic circuit module of claim 13, wherein pairs of mounting pads on
2 opposite major faces of said package carrier are electrically interconnected, and the
3 connection elements of one of said IC packages are conductively bonded directly to
4 said interconnection pad array.

15. The electronic circuit module of claim 13, wherein said carrier comprises a
flexible polymeric film, and said opposing major faces are planar.

16. The electronic circuit module of claim 13, wherein said main circuit board
includes a recess for each package unit affixed thereto, said recess receiving at least a
portion of the body of one of said packages.

1 17. The electronic circuit module of claim 13, wherein said carrier comprises a semi-
2 rigid laminar substrate.

1 18. The electronic circuit module of claim 17, wherein said circuit board includes a
2 recess for each package unit affixed thereto, said recess receiving at least a portion of
3 the body of one of said packages.

19. The electronic circuit module of claim 17, wherein said carrier further comprises a plurality of carrier leads, and individual mounting pads of each mounting pad array are conductively coupled to individual carrier leads, said carrier leads being conductively bonded directly to said interconnection pad array.

20. The electronic circuit module of claim 19, wherein said carrier leads are gullwing shaped.

21. The electronic circuit module of claim 19, wherein said carrier leads are L-shaped, each lead being butt-soldered to a pad of the interconnection pad array.

22. The electronic circuit module of claim 17, wherein each of said opposing major faces incorporates a recess for receiving a single IC package.

23. The electronic circuit module of claim 17, wherein one of said major faces is planar, while the opposing major face incorporates a recess, one IC package of each package pair being mounted on said planar major face and the recess receiving at least a portion of the body of the other IC package of that pair.

24. An electronic circuit module comprising:
an IC package unit having
a plurality of IC packages, each package having a package body, an integrated circuit chip embedded within said body, and a plurality of connection

5 elements coupled to said chip which extend at least to the surface of said body;

6 a package carrier having two opposing major faces, each face having at least
7 one mounting pad array to which the connection elements of one IC package are
8 conductively bonded, each carrier providing a carrier interface coupled to the
9 connection elements of the IC packages on that carrier; and

10 a printed circuit board having at least one interconnection pad array affixed
11 thereto, each interconnection pad array conductively bonded to the carrier interface.

1 25. The electronic circuit module of claim 24, wherein pairs of mounting pads on
2 opposite major faces of said package carrier are electrically interconnected, and the
3 connection elements of one of said IC packages are conductively bonded directly to
4 said interconnection pad array.

5 26. The electronic circuit module of claim 24, wherein said carrier comprises a
6 flexible polymeric film, and said opposing major faces are planar.

7 27. The electronic circuit module of claim 24, wherein said main circuit board
8 includes a recess for each package unit affixed thereto, said recess receiving at least a
9 portion of the body of one of said packages.

1 28. The electronic circuit module of claim 24, wherein said carrier comprises a semi-
2 rigid laminar substrate.

3 29. The electronic circuit module of claim 28, wherein said circuit board includes a

4 recess for each package unit affixed thereto, said recess receiving at least a portion of
5 the body of one of said packages.

1 30. The electronic circuit module of claim 28, wherein said carrier further comprises
2 a plurality of carrier leads, and individual mounting pads of each mounting pad array are
3 conductively coupled to individual carrier leads, said carrier leads being conductively
4 bonded directly to said interconnection pad array.

1 31. The electronic circuit module of claim 30, wherein said carrier leads are gullwing
shaped.

2 32. The electronic circuit module of claim 30, wherein said carrier leads are L-
shaped, each lead being butt-soldered to a pad of the interconnection pad array.

1 33. The electronic circuit module of claim 24, wherein each of said opposing major
2 faces incorporates a recess for receiving a single IC package.

1 34. The electronic circuit module of claim 24, wherein one of said major faces is
2 planar, while the opposing major face incorporates at least one recess, at least one IC
3 package being mounted on said planar major face and each recess receiving at least a
4 portion of the body of an IC package.